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Interactive comment on “CHAMP climate data based on inversion of monthly average bending angles” by J. Danzer et al.

Anonymous Referee #2

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This paper is a straight-forward application of the average-profile inversion (API) algorithm presented in Gleisner and Healy (2013) to multi-year record of CHAMP data, which are noisier and have sparse coverage compared to COSMIC data. The authors found that additional quality control were required on the CHAMP bending angles and concluded that the CHAMP API retrievals yielded good results. Overall, I think that this is a nice focused follow-on study to Gleisner and Healy and recommend its publication after addressing the following comments. My main concern is the first comment below: conclusions drawn from comparisons with ECMWF analysis need to be supported somehow or rephrased to reflect the uncertainty inherent in such comparisons.

(1) Throughout the paper, statements were made that the new approach was better because it agrees better with ECMWF. Also it was stated that “the slightly increased

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bias of the new approach relative to ECMWF data. . . point to some remaining problems with the averaging approach.” (P7825,L9-11) What is the expected accuracy of ECMWF at large altitudes? Can it be really used as a basis of truth here?

(2) Figs 3-5: The plots lack detailed structure of the differences. Is there any reason not to show the smaller differences? 0.2% in refractivity scales to ~ 0.5 K in temperature, which is not negligible for climate studies, so I think it is important to show the climatological differences at these levels. In addition, besides showing an example from a particular month, it would be instructive to show mean and standard deviation of the differences when averaging over all the months so we can get some sense of the month-to-month variabilities.

(3) P7817,L6: “Furthermore the measurement noise grows in magnitude with increasing altitude.” I think you meant the measurement noise grew fractionally with altitude.

(4) P7817,L10-11: “Furthermore, the sensitivity at the assumed scale height was tested, and it had little impact below 40 km.” Could you quantify what “little impact” mean?

(5) L7818,L18-20: “Below 50 km, errors resulting from . . .” should be changed to “Below 50 km, random errors resulting from . . .” since systematic errors would not average out.

Minor comments:

(6) P7813,L12: “GNSS-RO it is likely. . .” -> “GNSS-RO is likely. . .”

(7) P7813,L18: “the primary observable is. . .” -> “the primary observables are. . .”

(8) P7814,L21: “e.g zonally. . .” -> “e.g., zonally. . .”

(9) P7820,L13: “medians” -> “median”

(10) P7821,L22: “always to apply” -> “to always apply” (or simply “to apply”)

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